from its external border, by a longitudinal artery which starts from the right brachio-cephalic trunk, and which probably represents the internal thoracic artery. The intercostal arteries are separated at their origin, and take part, like the foregoing artery, in the formation of the plexuses. There is only a single renal artery on each side; but we find two renal veins, a large one in front, and a much smaller one behind. The obliterated umbilical arteries, which terminate at the summit of the bladder, are connected with the hypogastric arteries, which each divide into two branches and form, in spite of their small size (the little finger can scarcely be inserted into them), the sole source of the blood contained in the enormous genital arterial plexus. This plexus completely covers the anterior portion of the vagina, the uterus and its cornua; but it does not extend in front into the broad ligament.

The venous plexuses appear to be little developed, and those of the psoas are wanting as in the Mysticetes. On the other hand, there is a venous sinus in each of the large lobes of the liver, and the sinus of the vena cava inferior assumes enormous proportions. A large longitudinal vein traverses the right thoracic plexus, and receives three large branches at least from the medullary cavity; it is by this vein, which functionally replaces the absent azygos veins, that the blood of the medullary veins returns into the vena cava anterior. In short, judging by all the characters with which we are so far acquainted, the circulatory apparatus of *Hyperoodon* appears to approach that of the terrestrial ancestral forms of the group, less, however, than that of the Mysticetes, but much more than that of the non-Ziphioid Cetodonts.—*Comptes Rendus*, t. cxiii. no. 17 (Oct. 26, 1891), pp. 563–565.

On Self-pollination in Amsonia Tabernæmontana.

By Thomas Meehan.

To my mind the number of plants which have their flowers constructed for self-fertilization is so large, that it would seem hardly worth particularizing them but for the industrious work of noting the opposite characteristics which prevails in our scientific serials. It seems not fair to true science that only one side of nature's story should be told. This is why I record some self-fertilizing cases.

It has been left to me to point out that only those plants which have other means of persistence than by seeds have flowers which are wholly dependent on external agents for pollination, and also to show that while flowers which have arrangements for self-fertilization are abundantly fertile, those which cannot make use of pollen without assistance are frequently barren, and are at a sad disadvantage in making their way through the world. So clearly has this been worked out to my mind, that when a plant is found abundantly

fertile it is fair to assume that it must be arranged for self-pollination. In Asclepiadaceæ, with the large majority of the flowers barren, we may theoretically assume insect agency,—with many abundantly fertile Apocynaceæ we may assume self-fertilization.

I have already shown that the Madagascar periwinkle, *Vinca rosea*, with every flower fertile in American gardens, is a self-fertilizer. Another of the same order, *Amsonia Tabernæmontana* (the form known as *A. salicifolia*, Pursh), is abundantly fertile. I watched the flowers this season, satisfied that they would be found arranged for self-pollination. The plants proved, as usual, abundantly fertile. On one panicle there were twenty-nine pairs of follicles that matured; there were many others that had been evidently fertilized, but failed to reach maturity through lack of nutrition.

Showy as the blue flowers are, and we might suppose, in view of prevailing speculations, made so in order to be attractive to insects, the arrangements are such that no insect, not even the ubiquitous thrips, can gain entrance to the nectary. The mouth of the tube is so densely matted with hair that *Faux clausa* is the term used in the description of the species by Latin authors. If a pollen-clothed tongue were thrust through the mass it would be thoroughly cleaned, and in like manner the flower's own pollen would be brushed back when the insect withdrew its tongue. But a greater difficulty presents itself. The capitate stigma with its surrounding rim completely fills the upper portion of the tube. There is no space for an insect's tongue to get past the stigma. But even could this rubicon be passed, a dense mass of hair presses close against the style, and the most powerful insect known to the writer could hardly force a passage. The entrance of insects is completely blocked. To provide for pollination the anthers curve over and rest on the stigma, and the pollen on ejection from the anthers can do no more than cover the stigma.

In many plants which have flowers that are generally fertilized by their own pollen the arrangements will often permit of pollination from some other; but in the case of this *Amsonia* nothing but self-pollination is possible.

To those who may not have flowers for comparison the figure of this plant in 'Botanical Register,' pl. 151, will aid in making some of the above-noted points clear.—*Proc. Acad. Nat. Sci. Philad.* March 29, 1892, p. 162.